Walking speeds on horizontal planes and descending stairs for blind and visually impaired people.

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Walking speeds on horizontal planes and descending stairs for blind and visually impaired people.

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ÖRESUND – KATTEGAT – SKAGERRAK

Outline

- Introduction
  - Why is it important to consider blind and visually impaired people?
- Method
  - Test locations
  - Video footage
  - Person density
- Results and discussion
  - Walking speed on horizontal planes
  - Walking speed descending stairs
- Conclusion

Introduction

Why is it important to consider blind and visually impaired people?

- Around 1 out of 6 persons are living with a temporary or permanent impairment worldwide.
- 4 % has a visual impairment worldwide.
- Visually impaired people are actively taking part in different parts of the society.
- All buildings are accessible for all sections of the population – including people with disabilities.
- Accessibility do not ensure egressibility.
- Studies have shown that people with impairments are more likely to suffer during an emergency situation.
- Blind and visually impaired people have special needs during an evacuation which should be considered.
- Nowadays evacuation models are not validated for blind and visually impaired people because data are limited.

Method

- Experimental study of evacuation characteristics for people with visual impairments.

- Evacuation exercise on three different levels:
  - Single evacuation
  - Group evacuation
  - Full scale evacuation

- Instruction of the participants was dependent on the level

- 46 participant in the age of 10 to 69 years old.

- No distinguishing in degree of visual impairment.

Test Locations

- 4 different buildings
  - Two-storey buildings
  - Three-storey buildings
  - No specific installations for visually impaired people

- The participants are familiar with the test environment.

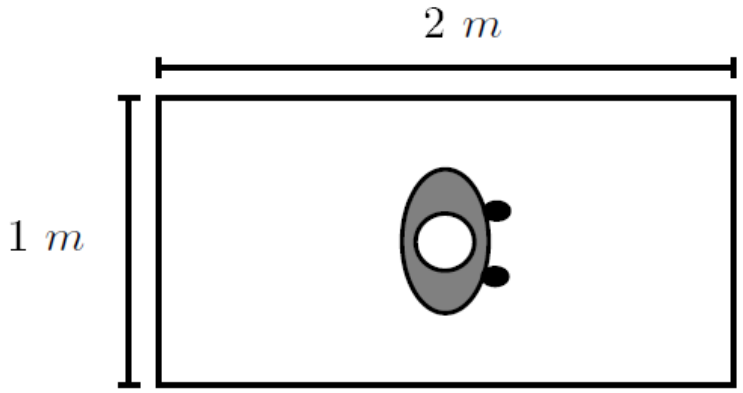
- There are stairs and long corridors at all four locations which are used as means of egress.

Video Footage

- All exercises are recorded with fixed video cameras.
- Main corridors and stairs are filmed.
- The cameras used are filming in a wide angle of 170 degrees with a rotatable lens.
- The cameras are pointing both directly downwards and are turned an angle.
- Doors are filmed from both sides.
- Stairs are filmed from top and bottom.

Person Density

- The reference area for the person density on horizontal planes is 2 m^2.
  - 1 meter in front and behind the person in focus.
  - 1 meter in width including the person in focus.
  - A guiding dog is considered as a person. (can be an obstacle to the blind or visual impaired person.)

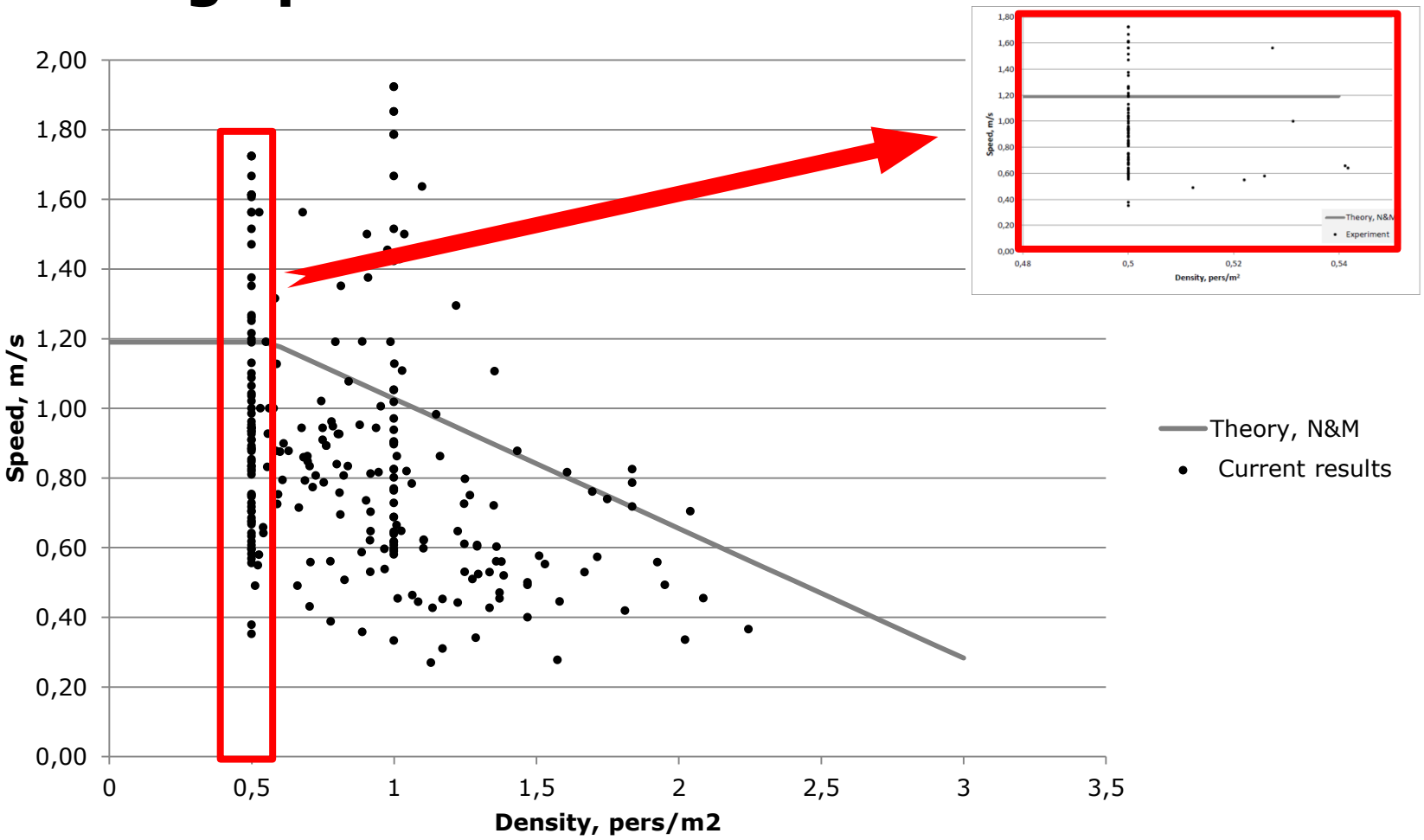


- A chequered mat is used to determine the density.

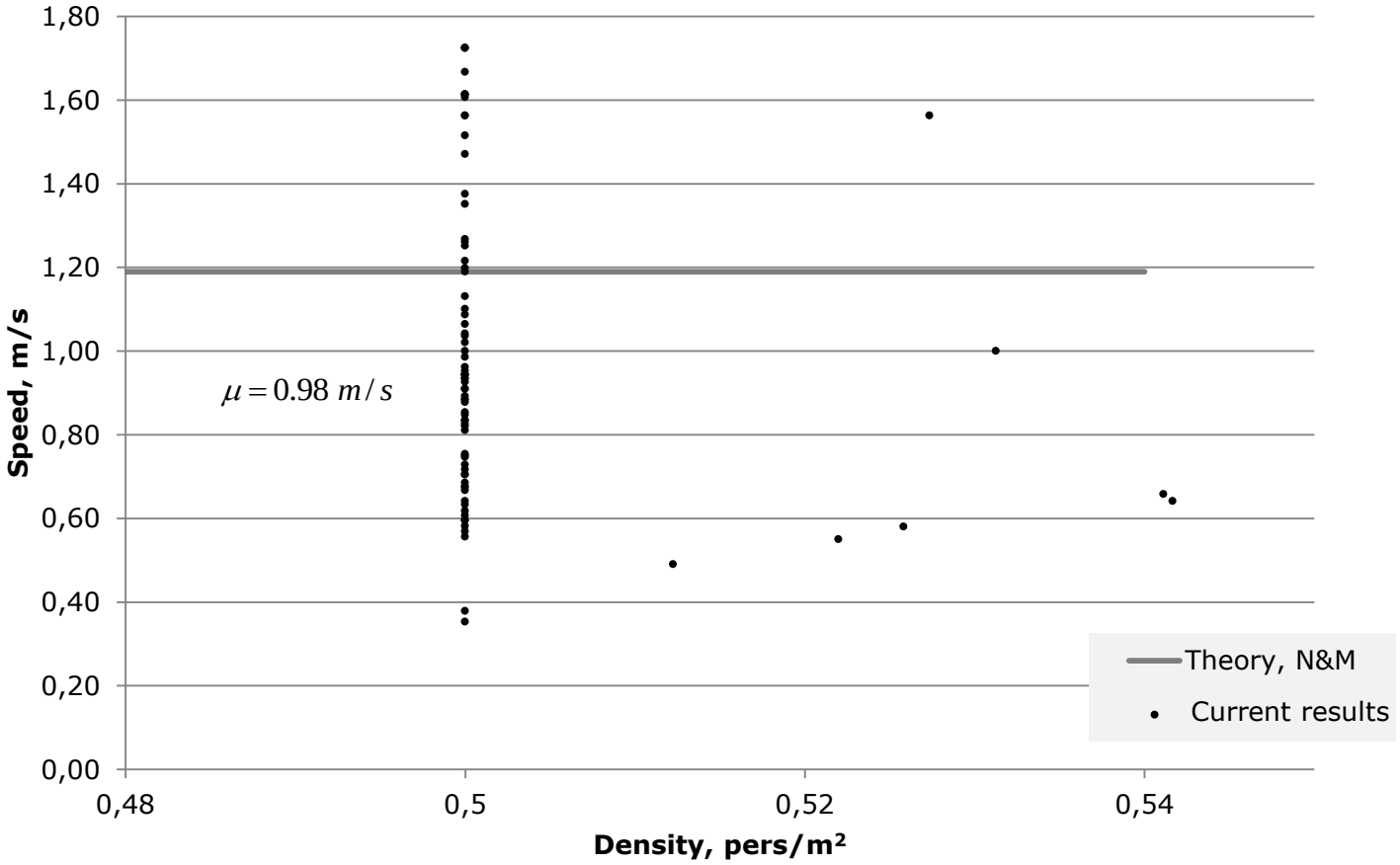
Results and Discussion

- Video-example from full scale exercise.
- Walking speed horizontally at low and high densities.
- Walking speed descending stairs at low and high densities.

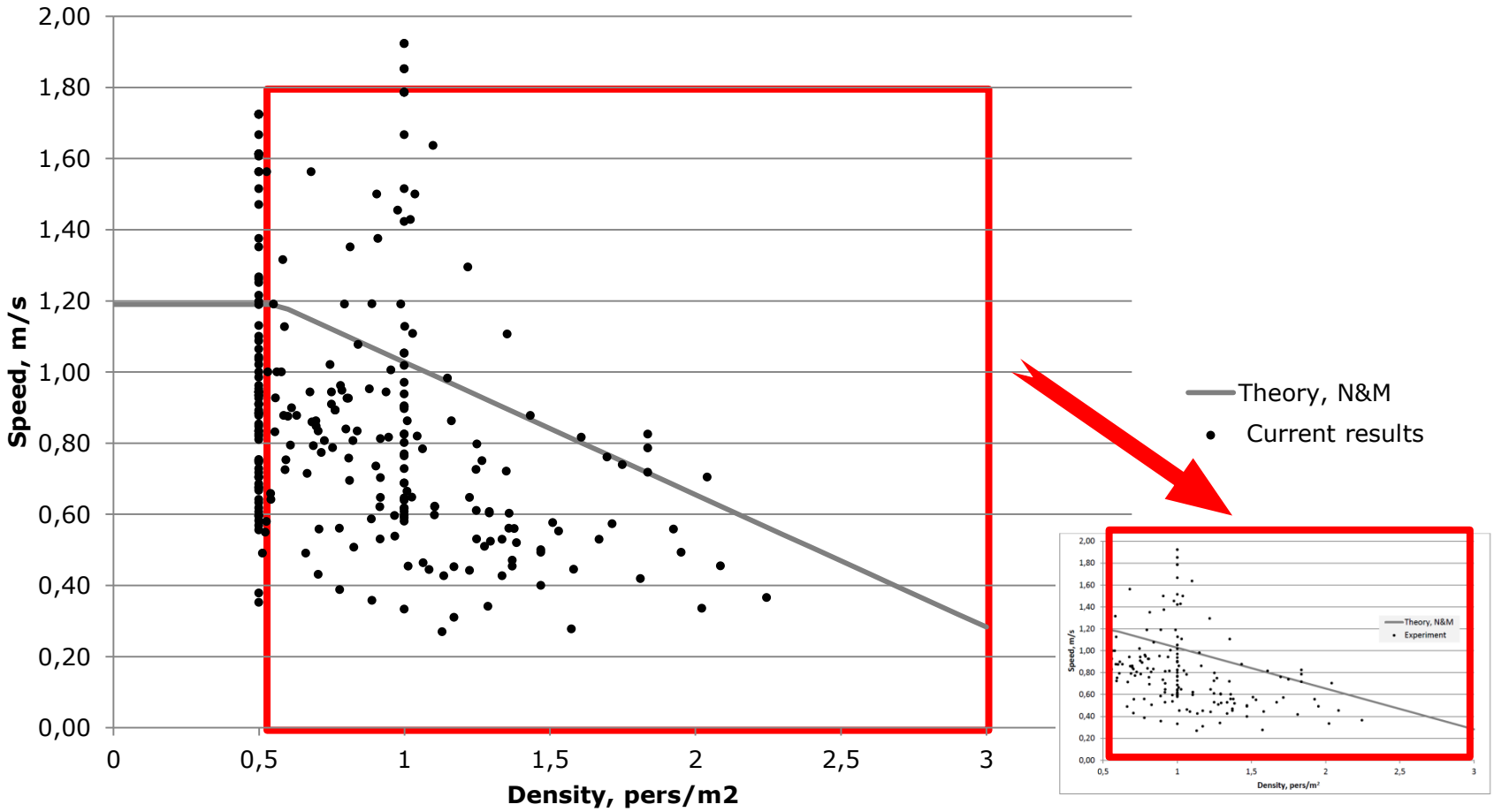
Walking speed horizontal



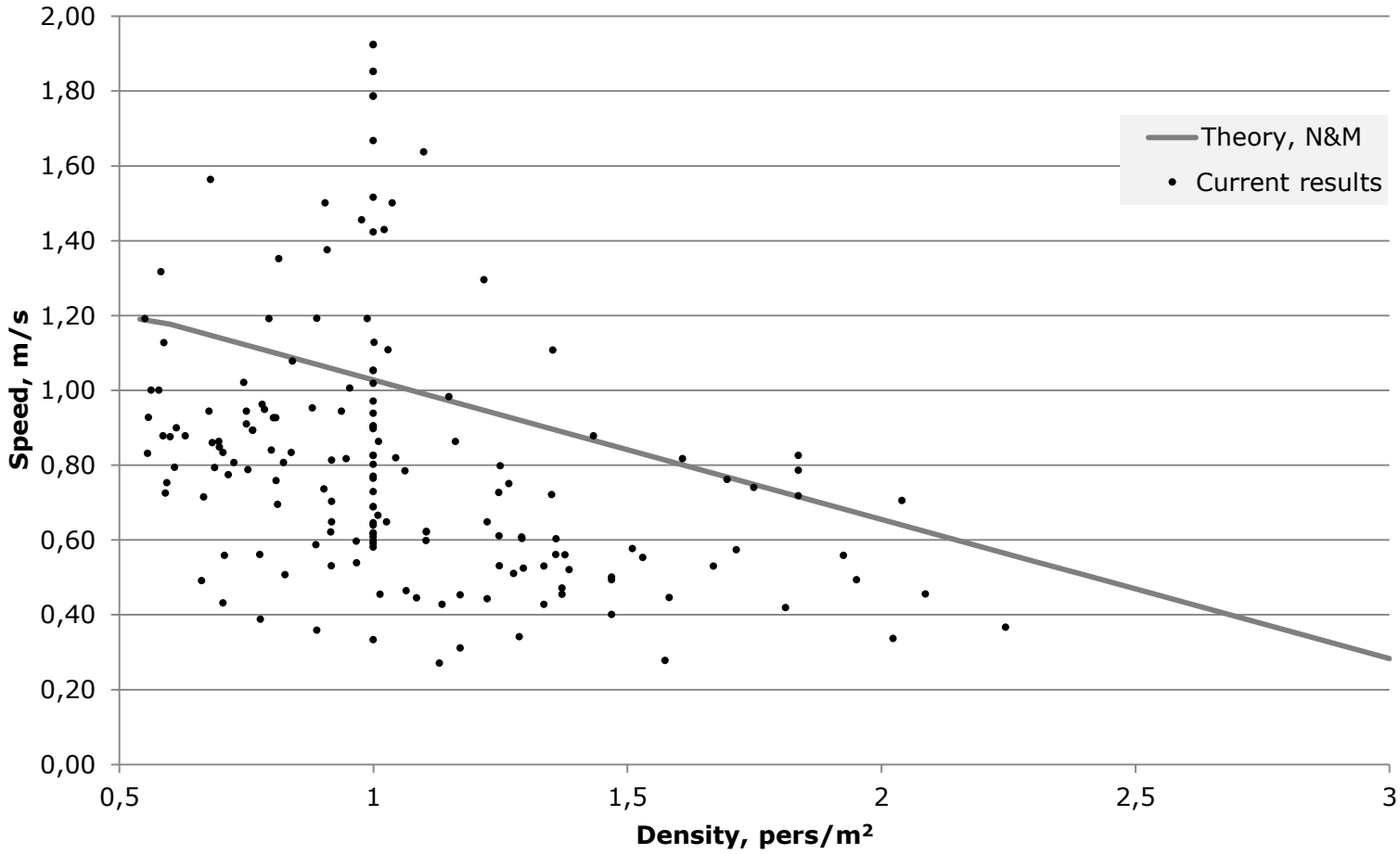
Low density - horizontally



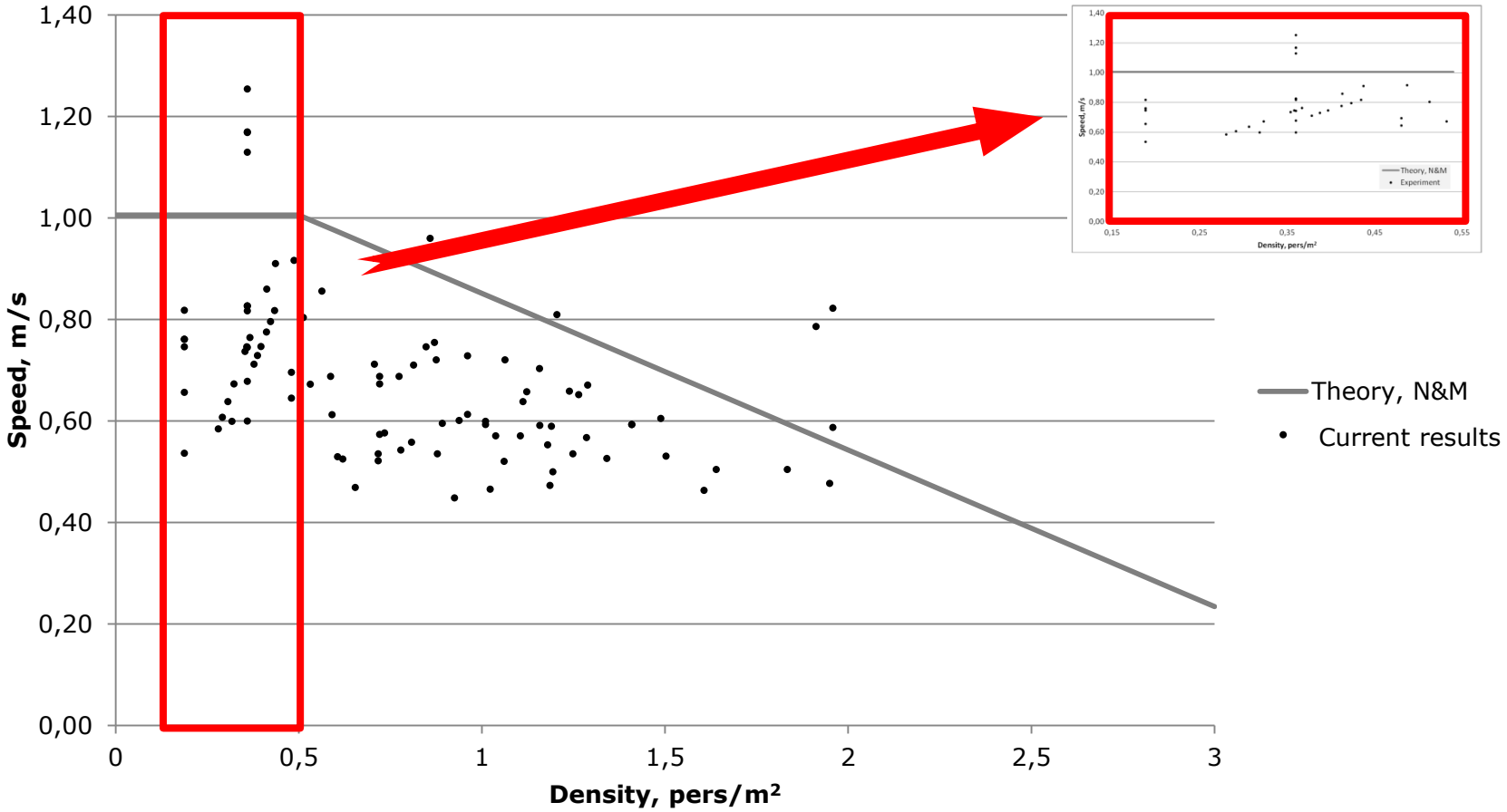
Walking speed horizontal



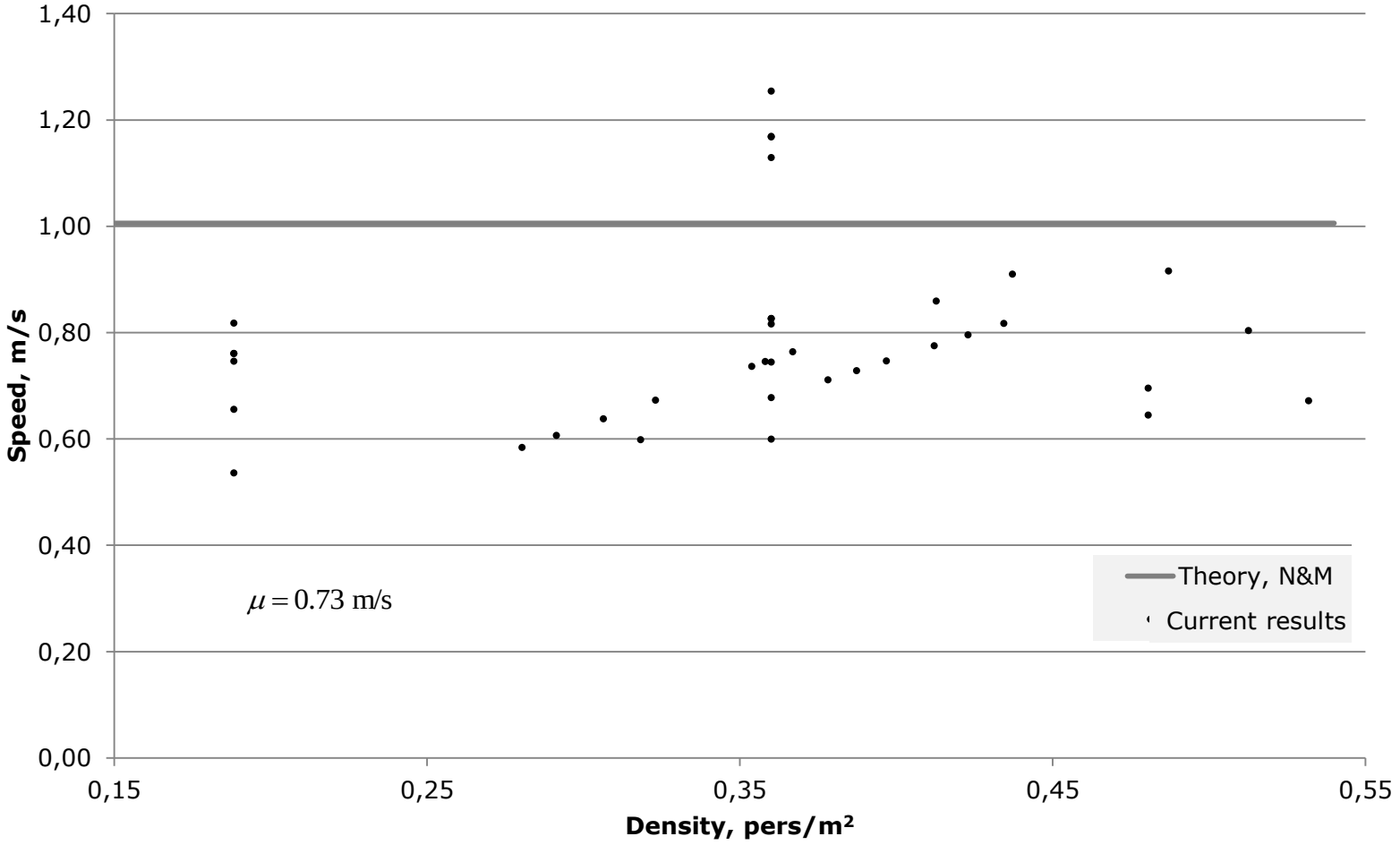
Higher density - horizontally



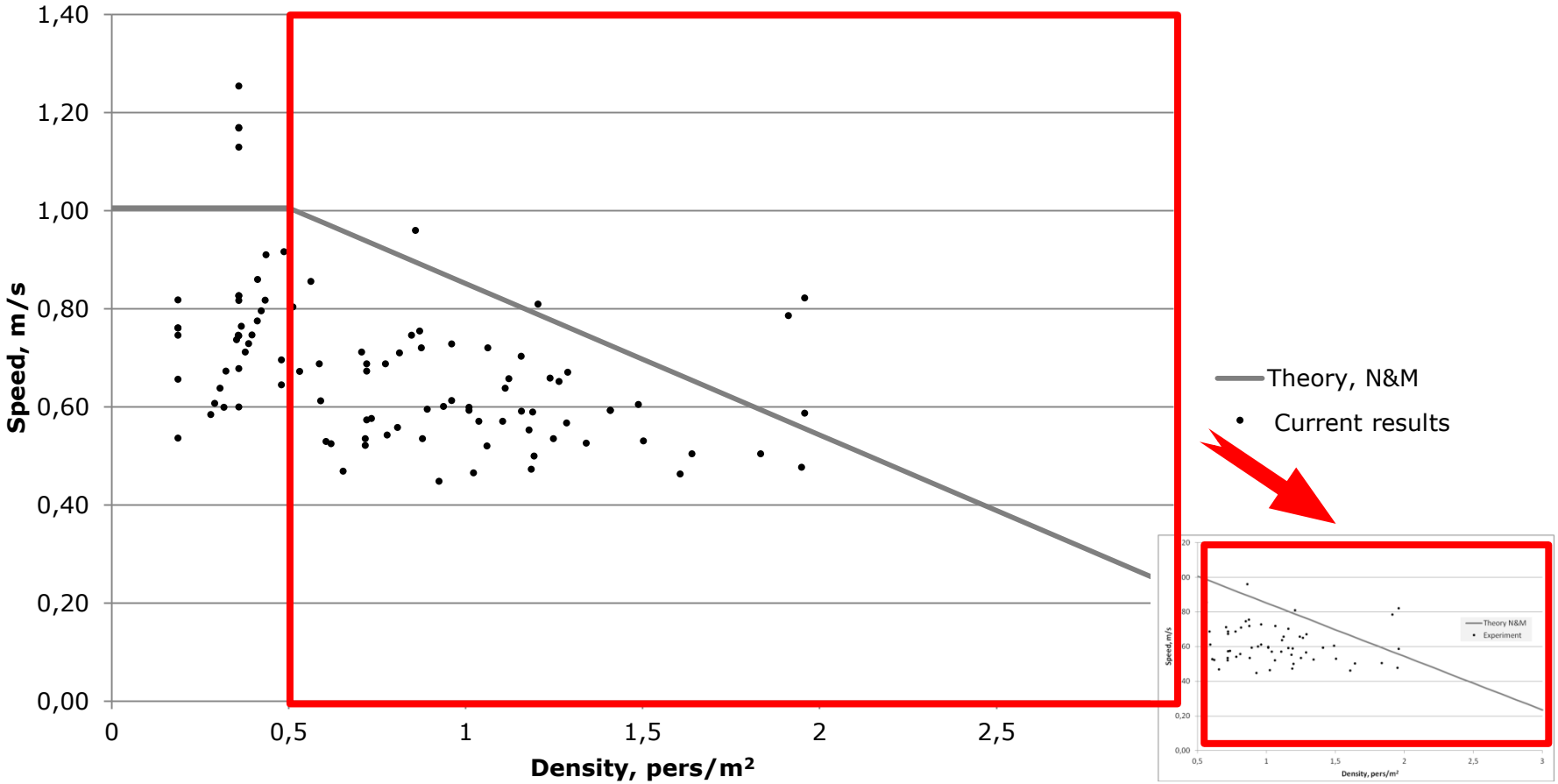
Walking speed descending stairs



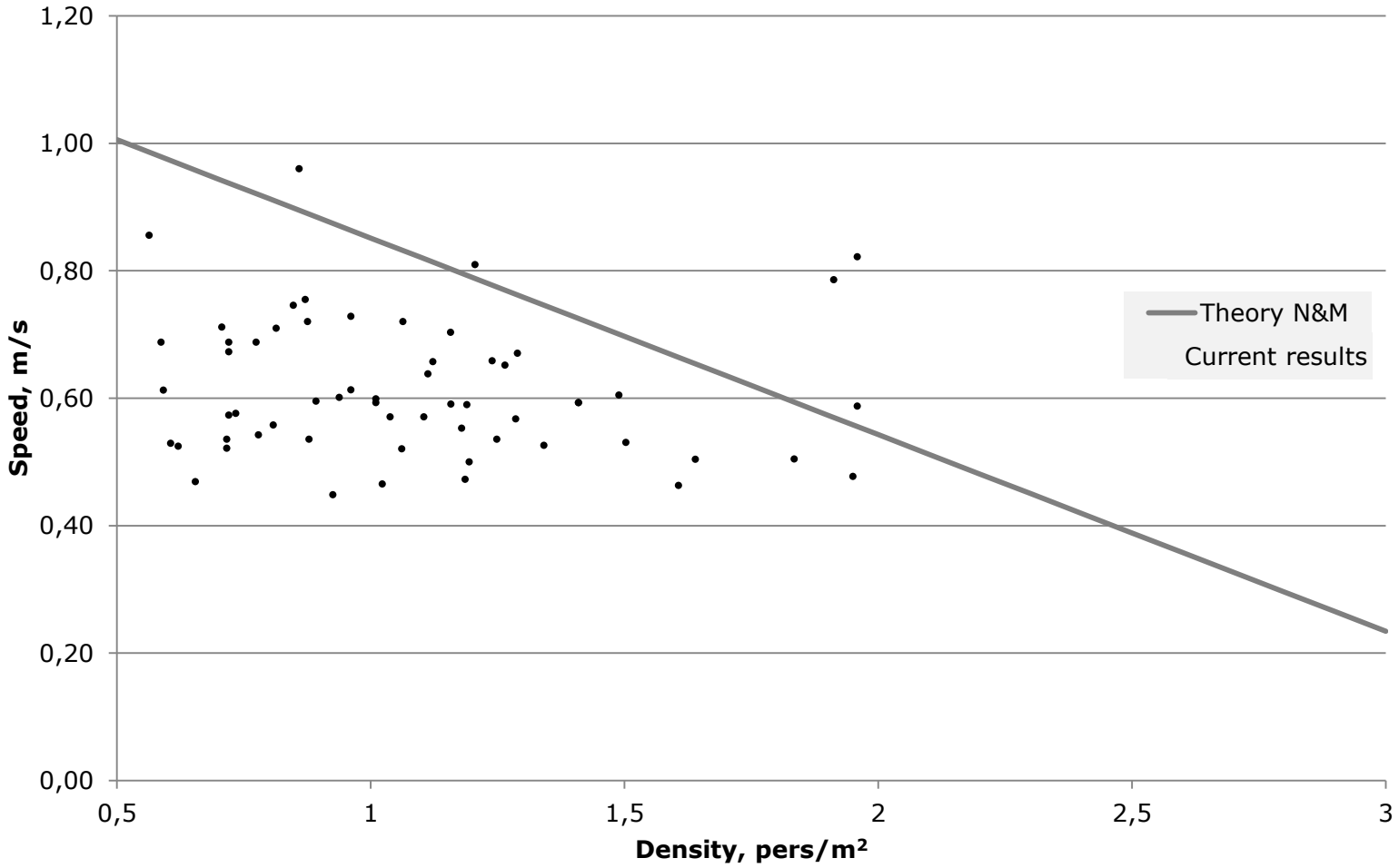
Low density – descending stairs



Walking speed descending stairs



Higher density – descending stairs



Conclusion

- As the accessibility to buildings increases it is important to secure blind and visually impaired people in the same manner as able-bodied people.

- The experiments shows that
  - Walking speed at low densities both horizontally and descending stairs are significantly lower than the theoretical value given by Nelson and Mowrer.
  - Walking speeds at higher densities shows the tendency that the experimental relation between walking speed and density is displaced downwards from the theoretical linear relation between speed and density.
  - It is not conservative to apply the theory of Nelson and Mowrer for blind and visually impaired people.

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